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(71) Applicant *(for all designated States except US)*: **MULTIBRÁS S.A. ELETRODOMÉSTICOS** [BR/BR]; Av. das Nações Unidas, 12995, 32° andar, CEP-04578-000 São Paulo, SP (BR).

(72) Inventors; and
(75) Inventors/Applicants *(for US only)*: **MARQUES, Marco, Eduardo** [BR/BR]; Rua Orestes Guimarães, 421, Apt. 501, CEP-89204-060 Joinville, SC (BR). **RÉGNIER PEDROSO, Marco, Antonio** [BR/BR]; Rua Lages, 34, Apt. 201, Centro, CEP-89204-010 Joinville, SC (BR). **FERREIRA, Gilmar, Canali** [BR/BR]; Rua Desembargador Nelson Nunes, Guimarães, 365, Apt. 302, CEP-89203-060 Joinville, SC (BR).

(74) Agents: **ARNAUD, Antonio, M., P._ et al.**; Rua José Bonifácio, 93, 7th floor, CEP-01003-901 São Paulo, SP (BR).

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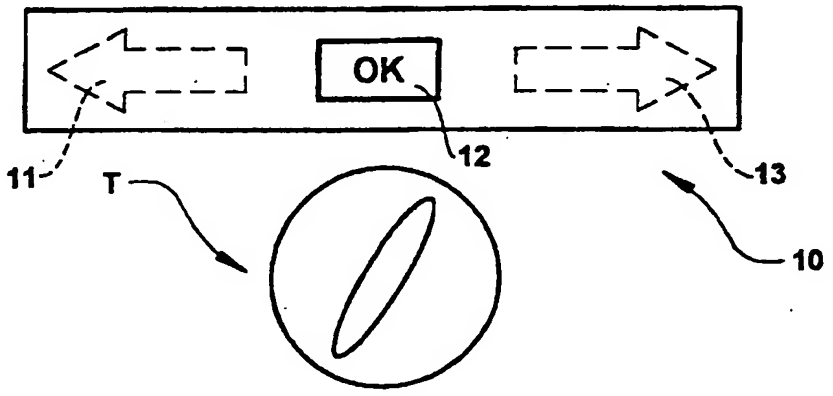
(54) Title: A DEVICE FOR INDICATING THE TEMPERATURE CONDITION IN REFRIGERATION APPLIANCES



(57) Abstract: A device for indicating the temperature condition in refrigeration appliances, comprising a display (10) provided inside the cabinet of the refrigeration appliance and formed by demarcated regions (11, 12, 13, 14, 15) consisting of a heat sensitive element of the Master, liquid crystal or similar type, whose message and/or color is enhanced and distinguished when submitted to a determined temperature condition, in order to provide a visual indication to the user about the need for adjusting the thermostat (T) and the direction of adjustment to be applied to the thermostat (T) of the refrigeration appliance.

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A DEVICE FOR INDICATING THE TEMPERATURE CONDITION IN REFRIGERATION APPLIANCES.

Field of the Invention

The present invention refers to a device for indicating the temperature condition inside the cabinet of refrigeration appliances, such as the known refrigerators of domestic use, in order to inform the user how to better adjust the thermostat of said refrigerators.

Background of the Invention

The refrigerators of domestic use have the operation of the refrigeration system commanded by an adjustable thermostat, which is positioned to detect the temperature inside the cabinet to be refrigerated, activating and deactivating the refrigeration system according to the adjustment made by the user.

However, the adjustment which the user applies to the thermostat is most of the time based on his understanding, upon observation, that the internal conditions of the refrigeration appliance are out of the patterns which he thinks are adequate, requiring more or less cold. Thus, the user has no indication about the convenience or even necessity of modifying the operational pattern of the refrigeration system, as a function of the thermal load to which it is being subjected. The result of this lack of orientation to the user is the frequent inadequate adjustment of the operation of the refrigeration system by the user actuating the knob of the thermostat.

The incorrect adjustment of the thermostat in these refrigeration appliances is a common source of performance problems claimed by the users, from their understanding that this incorrect use of the available adjustment is a defect of the product.

The difficulty of the user to correctly operate the thermostat results from the fact that the internal temperatures of the refrigeration appliance depend on several factors, such as external temperature, loading condition, intensity of door openings, etc. Since there is not usually provided any indication about the internal temperature conditions in the refrigeration appliance, since there is no precise correlation between the position of the thermostat and the internal temperature of the cabinet, and since the user ignores the ideal internal temperatures, as well as the operational mode of the thermostat, the adjustment of the latter is made empirically, allowing the occurrence of errors.

Disclosure of the Invention

The object of the present invention is to provide an indicating device, to be installed inside the cabinet of a refrigeration appliance, which has a simple construction and which gives the user an indication about the temperature conditions inside said cabinet, in order to allow a more precise and adequate adjustment of the thermostat which controls the operation of the refrigeration system of the appliance.

The present indicating device is used to aid the adjustment of the thermostat of the refrigeration appliance of the type comprising a cabinet refrigerated by a refrigeration system, whose operation is controlled by means of a thermostat.

According to the invention, the indicating device comprises a display mounted inside the cabinet and formed by a plurality of demarcated regions, each of said regions consisting of a heat sensitive element, usually of the Master or liquid crystal type, whose color is enhanced and distinguished when submitted to

a determined temperature condition, one of said regions being activated at a temperature corresponding to a temperature recommended for the inside of the cabinet, and at least two other demarcated regions, which are activated at lower and higher temperatures, respectively, in relation to said recommended temperature, each of said demarcated regions being associated with an operational instruction to the user about the thermostat.

With the constructive arrangement defined above, the user now has, through the automatic thermal activation of one of said regions of the indicating device, a visual indication about the operation to be applied to the thermostat, including the instruction to maintain the adjustment knob of the latter in its position, or to rotate said knob in the indicated direction, in order to provide more or less cold to the inside of the cabinet.

Brief Description of the Drawings

The invention will be described below, with reference to the attached drawings, in which:

Figure 1 illustrates a schematic front view of a possible embodiment for the indicating device to be mounted inside the cabinet of the refrigeration appliance, preferably close to the adjustment knob of the thermostat, said device being with a central region of its display activated and indicating that the internal temperature of the cabinet does not require adjustment of the thermostat;

Figures 2 and 3 are similar views to that of figure 1, but indicating the need for adjusting the thermostat, in order to increase and reduce, respectively, the internal temperature of the cabinet; and

Figures 4-6 illustrate a construction of the indicating device being activated and indicating

different internal temperature conditions of the cabinet.

Best Mode of Carrying Out the Present Invention

As already mentioned above, the present indicating device comprises a display 10 to be mounted inside the cabinet (not illustrated) in any adequate place exposed to the internal operational temperature of the refrigeration appliance, and visible to the user at least when he opens the cabinet door.

In the figures given as an example of a possible embodiment, the display 10 is provided close to the adjustment knob of the thermostat T that controls the operation of the refrigeration system of the appliance. However, it should be understood that the adjustment knob of the thermostat T may be located in any other place, even outside the cabinet.

According to figures 1-3, the display 10 is formed by three demarcated regions 11, 12, 13, each one being defined by a heat sensitive element of the Master, liquid crystal or similar type, whose color is enhanced and distinguished when submitted to a determined temperature.

In the example illustrated in figures 1-3, the demarcated regions 11, 12, 13 of the display 10 are on line, the central region 12 consisting of a heat sensitive element, whose color is activated and distinguished when submitted to a temperature corresponding to that recommended for the cabinet of the refrigeration appliance, in order to indicate to the user this temperature condition and, consequently, the adequate adjustment condition of the thermostat T.

The left end region 11 consists of a heat sensitive element, whose color is activated and distinguished when submitted to a lower temperature, by a certain value predetermined during project, in relation to the

temperature recommended for the refrigeration appliance, indicating to the user the need for adjusting the thermostat, in order to provide less cold to the inside of the cabinet.

The right end region 13 consists of a heat sensitive element, whose color is activated and distinguished when submitted to a higher temperature in relation to the temperature recommended for the refrigeration appliance, indicating to the user the need for adjusting the thermostat T, in order to provide more cold to the inside of the cabinet.

As illustrated in figures 1-3, the demarcated regions 11, 12, 13 of the display 10 may be configured in such a way that, when activated, they define a message indicative of the adjustment to be imparted to the thermostat T, making easier for the user to understand the operation of the indicating device and to promote the adequate adjustment in the operational conditions of the refrigeration system. In the example illustrated in figures 1-3, the central region 12 is configured to define the message "OK" to the user, whereas the end regions 11, 13 are configured in arrows turned to opposite directions and configured to define the message "ADJUST".

It should be also understood that the heat sensitive demarcated regions 11, 12, 13 may be provided in a larger number and with an arrangement other than the rectilinear.

In case multiple demarcated regions are provided to indicate the need for adjusting the thermostat T to a higher or lower graduation, the activation of each of said regions to a respective temperature condition should indicate a corresponding degree of adjustment to be imparted to said thermostat T.

In the construction illustrated in figures 4-6, the display 10 has at least two demarcated regions 14 and 15, which are also defined by a heat sensitive element of the Master, liquid crystal or similar type, whose message and/or color is enhanced and distinguished when submitted to a determined temperature.

In this example, when the inside of the refrigeration cabinet is in ideal refrigeration conditions, for instance, between 2 and 5°C, the display 10 shows nothing or indicates to the user an ideal temperature condition.

The upper region 14 consists of a heat sensitive element, whose message and/or color is activated and enhanced when submitted to a temperature which is higher than the temperature recommended for the appliance, indicating to the user the need for adjusting the thermostat T, in order to provide more cold to the inside of the cabinet.

The lower region 15 consists of a heat sensitive element, whose message and/or color is activated and enhanced when submitted to a temperature which is lower, by a certain value predetermined during project, than the temperature recommended for the refrigeration appliance, indicating to the user the need for adjusting the thermostat T, in order to provide less cold to the inside of the cabinet.

CLAIMS

1. A device for indicating the temperature condition in refrigeration appliances, of the type comprising a cabinet refrigerated by a refrigeration system, whose operation is controlled by means of a thermostat (T), characterized in that it comprises a display (10) mounted inside the cabinet and formed by a plurality of demarcated regions (11, 12, 13, 14, 15), each of said regions consisting of a heat sensitive element, whose message and/or color is enhanced and distinguished when submitted to a determined temperature condition, at least two of said demarcated regions (11, 13, 14, 15) being activated at lower and higher temperatures, respectively, in relation to a temperature corresponding to the temperature recommended for the inside of the cabinet, each of said demarcated regions (11, 12, 13, 14, 15) being associated with an instruction to the user to actuate the thermostat (T).

2. The device of claim 1, characterized in that each demarcated region (11, 12, 13, 14, 15) of the display (10) is configured to define, when thermically activated, an indicative message about the adjustment to be applied to the thermostat (T).

3. The device of claim 1, characterized in that the heat sensitive element is of the Master, liquid crystal or similar type.

4. The device of claim 1, characterized in that one of said regions (12) is activated at a temperature corresponding to the temperature recommended for the inside of the cabinet.

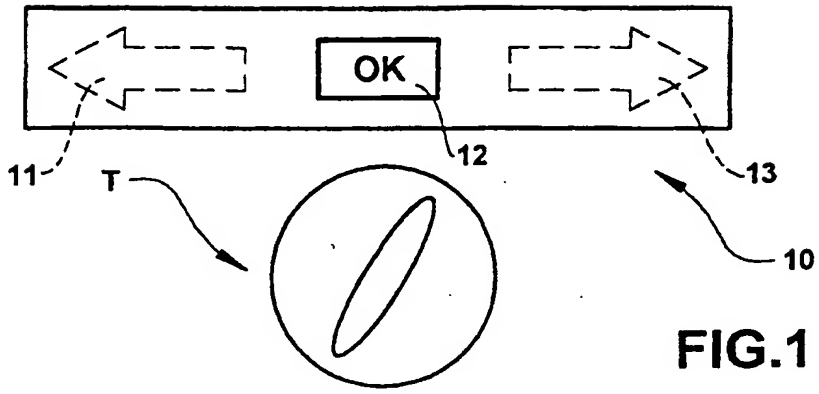

FIG.1

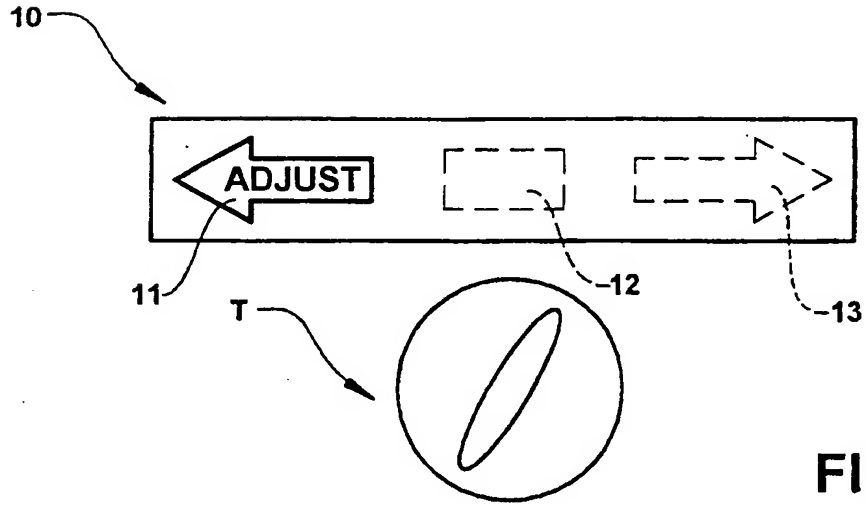

FIG.2

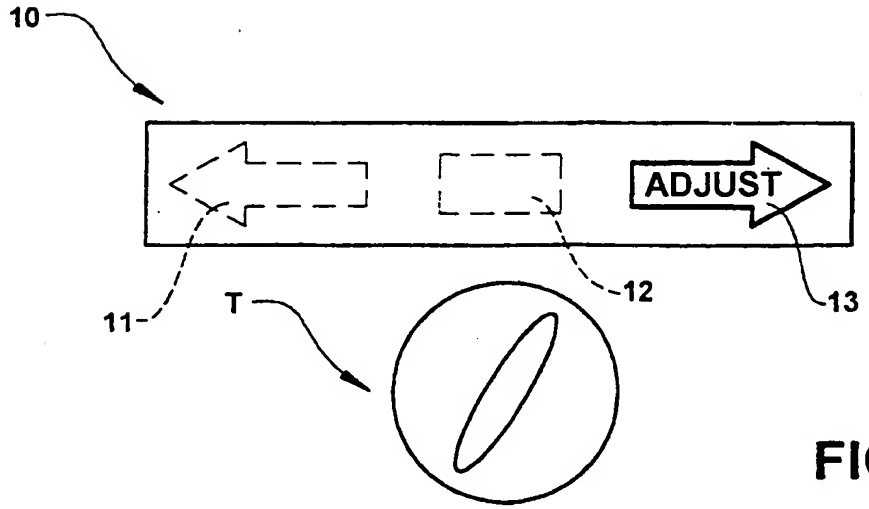

FIG.3

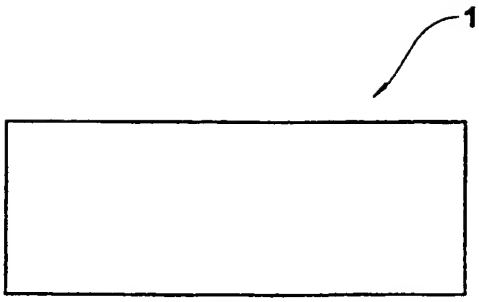

FIG.4

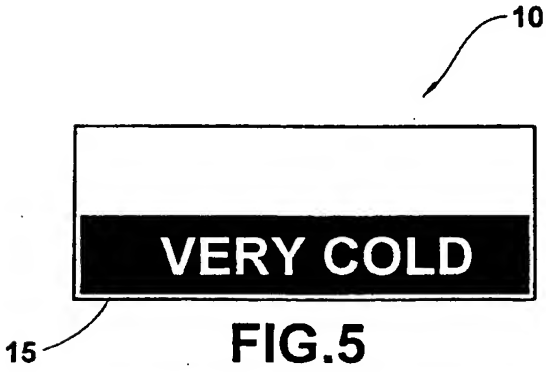

FIG.5

FIG.6

INTERNATIONAL SEARCH REPORT

International Application No
PCT/BR 00/00147

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G01K11/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G01K F24H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	figure 1B	3,4
Y	US 4 549 160 A (MCGHEE JAMES B) 22 October 1985 (1985-10-22)	1
A	figure 1	2
A	US 4 392 102 A (SUGALSKI RAYMOND K ET AL) 5 July 1983 (1983-07-05) abstract; figure	1,3
A	DE 35 20 242 A (B & M LIZENZ GMBH) 12 December 1985 (1985-12-12) figure 4	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents :

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Date of the actual completion of the international search	Date of mailing of the international search report
6 March 2001	13/03/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Ramboer, P

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/BR 00/00147

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